

or suggest doping a non-Al based layer with such an impurity, noting instead that Nomura discloses doping an AlGaAs quantum well active layer. Fukunaga discloses a semiconductor laser element having an InGaAsP quantum well active layer, but does not disclose doping this layer. The Examiner has asserted that it would have been obvious to one of ordinary skill in the art to dope the InGaAsP quantum well active layer of Fukunaga with an impurity as taught by Nomura. Applicants respectfully disagree.

Applicants have previously submitted that one of ordinary skill in the art would have no motivation to combine the cited references. Paragraph [0002] of Fukunaga explains that the presence of Al in the active layer can cause failure of a semiconductor laser device due to the oxidation of the Al. Fukunaga goes on to explain that using an InGaAsP active layer helps to eliminate this failure mode by making the quantum well active layer using Al-free materials.

Applicants' invention solves a problem that they found to exist when an InGaAsP active layer (or a similar Al-free active layer) is used. As detailed in paragraph [0010] of applicants' specification, applicants discovered that when an Al-free active layer is used, impurities present in the upper cladding layer (such as Zn) have a tendency to diffuse into the active layer, thereby partially disordering the quantum well and obscuring the phase boundary between the barrier layers and the well layers. Applicants then discovered that doping the active layer with impurities of a similar conductive type to those used in the upper cladding layer prevents the diffusion of impurities into the active layer, thereby improving the operability of the semiconductor laser. There is no evidence that persons of ordinary skill in the art were even aware of the problem, so there would have been no reason to solve it.

The Examiner has responded to applicants' argument by asserting that "the motivation for doping the active layer of Fukunaga is not needed, since this is taught in the Primary reference of Nomura." The Examiner is contending that as long as there is a motivation to use the quantum well active layer of Fukunaga, which has a different structure than that of Nomura, and is made of an

entirely different material, it is not necessary to provide a motivation to dope this new active layer. By taking this position, the Examiner inherently asserts that “doping is doping” regardless of the structure or composition of the layers being doped. Applicants respectfully disagree.

One of ordinary skill in the art who was motivated to replace a quantum well active layer with a quantum well active layer having an entirely different structure and composition would understand that the structure of the active layer and the materials of which it is made would control what affect doping would have on the layer. One of ordinary skill in the art would not expect that doping the two unique structures in a similar fashion would achieve positive results in both devices.

Nomura does not disclose or suggest that impurities be added to the AlGaAs active layer to prevent diffusion of impurities into the active layer. In actuality, the structure of Nomura’s quantum well active layer discussed above (with the well layers forming the top and bottom layers of the active layer) suggests that Nomura is not concerned with diffusion of impurities into the active layer. Furthermore, there is no indication in either reference that adding impurities into an InGaAsP would have any beneficial effect. It is improper to assume that impurities added to one material for a first beneficial purpose will have any beneficial effect, let alone a different beneficial effect, when added to a different material. Accordingly, the Examiner has again failed to provide proper evidence of a motivation to combine Nomura and Fukunaga to arrive at the claimed invention; no motivation exists in either of the references that would have led one of ordinary skill in the art to look to the other reference.

Claims 12, 22 and 25 recite features similar to claim 2 and are therefore allowable for the reasons detailed above. Claims 2-5, 10, 11, 13-15, 20, 21, 23, 24 and 26 depend from allowable claims and are therefore allowable due at least to their respective dependencies.

Claims 6-9 and 16-19 stand rejected under 35 USC 103(a) on Nomura in view of Fukunaga and Fukunaga (U.S. Patent Publication No. 2002/0044584, hereinafter, “Fukunaga-2”). Applicants respectfully traverse this rejection.

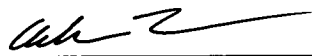
Fukunaga-2 does not disclose or suggest doping an InGaAsP quantum active layer nor does Fukunaga-2 provide any motivation to combine the references as detailed above. Accordingly, claims 6-9 and 16-19, which depend from allowable claims, are allowable due at least to their respective dependencies.

Applicants solicit an early action allowing the claims.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, applicants petition for any required relief, including extensions of time, and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing Docket No. **204552030500**.

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